REMARKS

In the Office Action the Examiner noted that claims 1-7, 9-16, 18 and 19 were pending in the application and the Examiner rejected claims 1-7, 9-15, 18 and 19 while objecting to claim 16. By this amendment various claims have been amended. Thus, claims 1-7, 9-16, 18 and 19 are pending in the application. The Examiner's rejections are traversed below.

Claim Objections

Line 1 of claim 18 has been amended in the manner requested by the Examiner in item 2 on page 2 of the Office Action.

Rejection under 35 U. S. C. § 103

In items 3-4 on pages 2-11 of the Office Action the Examiner rejected claims 1-3, 5-7, 9, 11-15, 18 and 19 under 35 U. S. C. 103(a), as unpatentable over Applicant's Admitted Prior Art (AAPA) in view of U.S. Patent 7,092,643 to Kajiya et al and further in view of Mikkelsen et al. and further in view of U.S. Patent Publication No. 2004/0081470 to Griffin.

Claim 1 as amended is directed to a separating apparatus for time division multiplexed signal light which is input with time division multiplexed signal light obtained by multiplexing a plurality of signal lights on a time axis. The apparatus includes first and second optical gate sections. The first optical gate section includes a first optical gate and a first drive circuit. Claim 1 further specifies that the second optical gate section comprises a second optical gate in which an optical transmission characteristic thereof with respect to a drive voltage is periodically changed, and a second drive circuit that supplies to the second optical gate, a second drive signal having a repetition frequency equal to the repetition frequency of the first drive signal. Claim 1 as amended clearly specifies that in the first optical gate section the transmittance thereof is periodically changed in accordance with the repetition frequency of "n" times a bit rate of a signal light of said plurality of signal lights, where n is a positive integer equal to or greater than 3. Thus, in the first drive circuit of the first optical gate section, a drive signal having a repetition frequency equal to the bit rate of the signal light of the plurality of signal lights is supplied to the first optical gate. Further, the drive signal has a voltage magnitude corresponding to a voltage difference in an n/2 period in the periodic optical transmission characteristic of the first optical gate, where n is greater than or equal to 3. Further, the second drive circuit that supplies a second drive signal to the second optical gate, has a repetition frequency equal to the repetition frequency of the first drive signal.

The Prior Art

The AAPA of Figure 15 and the related description relates to a configuration of a separating apparatus where the time division multiplexed signal light is branched into two, and one branched light is supplied to a unit 100A on a clock extraction side, and the other branched light is supplied to a unit 100B on a time division separation side of the signal light. Units 100A and 100 B are in common in the point of separating the timed division multiplexed signal light of 160 Gb/s into 10 Gb/s signal light, and in each of the units 100A and 100B, two optical gates, 101 and 102, each using the electro-absorption type optical modulators, are serially connected. It is noted that the AAPA employs a frequency doubler 105 as illustrated in Fig. 15.

The Kajiya reference relates to a Mach-Zehnder (MZ) optical modulator that modulates an output optical signal based on a modulation signal. The MZ optical modulator outputs the output optical signal that is turned ON/OFF in proportion to the modulation signal. A modulation factor is set as a suitable bias voltage and is applied to the MZ optical modulator, an initial phase is set to 0, and a sinusoidal wave of a repetitive frequency is input as the modulation signal. Consequently, the output optical signal is "output as an optical signal that is turned ON/OFF in the repetitive frequency 2Fc that is two times the repetitive frequency." *See* col. 1, lines 18-65. The MZ optical modulator modulates the continuous wave light.

Fig. 1 of Mikkelsen discloses a time division multiplexed (TDM) signal inputted to a first EA modulator of the demultiplexer, which is formed by multiplexing 16 channels of 20 Gb/s. *See* page 1400, col. 2, lines 3-5). For this inputted TDM signal, the first EA modulator is a signal at 10 Gb/s. *See* page 1401, col. 1, second paragraph.

Griffin, which is cited in combination with Mikkelsen, merely relates to an MZ intensity modulator.

Claim 1 Patentably Distinguishes Over the Prior Art

It is submitted that claim 1 as amended patentably distinguishes over the cited art either alone or in combination on the basis that the repetition frequency of "n" times a bit rate of a signal light of said plurality of signal lights, where n is a positive integer greater than or equal to 3.

Kajiya discloses a method of driving an optical modulator by a voltage magnitude of $2V\pi$, and a bias control method for minimizing an error from the voltage magnitude of $2V\pi$. However, Kajiya does not teach or suggest a voltage magnitude other than $2V\pi$, so that in Kajiya n would

be equal to 2. Kajiya clearly does not teach or suggest a situation where n is equal to or greater than 3.

Griffin primarily disclose a method or producing and transmitting an optical signal using phase shift keying, and a method of receiving phase shift key modulated optical signals. In phase shift keying, an optical transmittance (intensity) does not change, and only an optical phase is changed. All of the signals indicated in the Figures of Griffin except for Figures 9A and 9B have a waveform which is converted from a phase shift modulated signal into an intensity signal by the reception configuration illustrated in Fig. 3. It is only in paragraph [0054] of Griffin that Figs. 9A and 9B are described as showing "eye" diagrams for amplitude NRZ modulated data with conventional filtering and with Nyquist filtering. However, this description relates to a general intensity modulation system of an NRZ signal such that in the case of Griffin, n=1. There is no teaching or suggestion in Griffin of n=2 or more.

On page 6 of the final Office Action the Examiner takes the position that a general characteristic of the MZ intensity modulator is described in paragraph [0032] of Griffin. However Griffin, merely describes that an optical transmission versus drive voltage characteristics is cyclic so that regarding the use of the MZ optical modulator as an intensity modulator (optical gate), Griffin only discloses a situation where n=1. Thus, applicants submit that Griffin does not teach or suggest a "doubled modulation factor of the drive signal of the MZ modulator..." as suggested by the Examiner on page 6 of the Office Action.

In view of the above, it is submitted that the prior art does not teach or suggest the features of the separating apparatus of claim 1 in which the transmittance of a time division multiplexed signal light is periodically changed in accordance with a repetition frequency of "n" times a bit rate of signal light of the plurality of signal lights, where n is a positive integer equal to or greater than 3 and wherein the claimed separating apparatus includes:

> a first drive circuit that supplies to said first optical gate a drive signal having a repetition frequency equal to the bit rate of said signal light of the plurality of signal lights, and having the voltage magnitude corresponding to a voltage difference in an n/2 period in the periodic optical transmission characteristic of said first optical gate; and
>
> said second optical gate section comprises:
>
> a second optical gate in which an optical transmission characteristic thereof with respect to a drive voltage is periodically changed, and
>
> a second drive circuit that supplies to said second optical gate a second drive signal having a repetition frequency equal to the

repetition frequency of said first drive signal.

Therefore, it is submitted that claim 1 patentably distinguishes over the prior art.

Claim 18 Patentably Distinguishes Over the Prior Art

Claim 18 is directed to a demultiplexing apparatus comprising a Mach-Zehnder intensity modulator and an optical modulator. The Mach-Zehnder intensity modulator modulates time division multiplexed signal light and uses a drive signal having a repetition frequency equal to a bit rate of the plurality of signal lights and having a voltage magnitude corresponding to twice or more a V_{π} drive voltage. The modulated time division multiplexed signal light output from the Mach-Zender intensity modulator is modulated by an optical modulator which uses a drive signal with the same repetition frequency as the drive signal used for the Mach-Zehnder intensity modulator. These features are not taught or suggested by the prior art. Therefore, it is submitted that claim 18 patentably distinguishes over the prior art.

Claim 19 Patentably Distinguishes Over the Prior Art

Claim 19 is directed to a demultiplexing apparatus including a Mach-Zehnder modulator which uses a drive signal having a voltage magnitude corresponding to 3 times or more a V_{π} drive voltage. As explained above, this feature is not taught or suggested by the cited art, either alone or in combination. Therefore, it is submitted that claim 19 patentably distinguishes over the prior art.

Rejection of Claims 4 and 10

In items 5 and 6 of the Office Action, claims 4 and 10 were rejected on the basis of the prior art cited against claim 1 plus additional prior art relied on by the Examiner. However, the additional prior art relied on by the Examiner does not cure the deficiencies of the prior art cited against claim 1. Further, claims 4 and 10 depend from claim 1. Therefore, it is submitted that claims 4 and 10 patentably distinguish over the prior art.

Allowable Subject Matter

In item 7 on page 14 of the Office Action the Examiner objected to claim 16 but indicated this claim would be allowable if rewritten in independent form. Claim 16 depends from claims 1. Therefore, for the reasons set forth above and for the reasons indicated by the Examiner, it is submitted that claim 16 is in condition for allowance.

Request for Withdrawal of Finality and Entry of this Amendment

This initial Office Action after an RCE was made final despite the fact that two additional independent claims were added in this case. Since new claims 18 and 19 are not for the "same invention" claimed prior to the RCE, it is submitted that the finality of this first action after the RCE is improper under MPEP 706.7(b). Accordingly, it is requested that the finality of the Office Action be withdrawn. It is also respectfully requested that the brief amendment which is introduced by way of this amendment after final be considered by the Examiner since it should not require an additional search. For example, as explained above, claim 19 previously recited "a voltage magnitude corresponding to the three times or more a Vπ drive voltage."

SUMMARY

It is submitted that none of the references, either taken alone or in combination, teach the present claimed invention. Thus, claims 1-7, 9-16, 18 and 19 are deemed to be in a condition suitable for allowance. Reconsideration of the claims and an early of Notice of Allowance are earnestly solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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Date: 7-6-09

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